Strengthening links in Mathematics:

Pupil involvement in strengthening links

Wavendon Gate Primary School

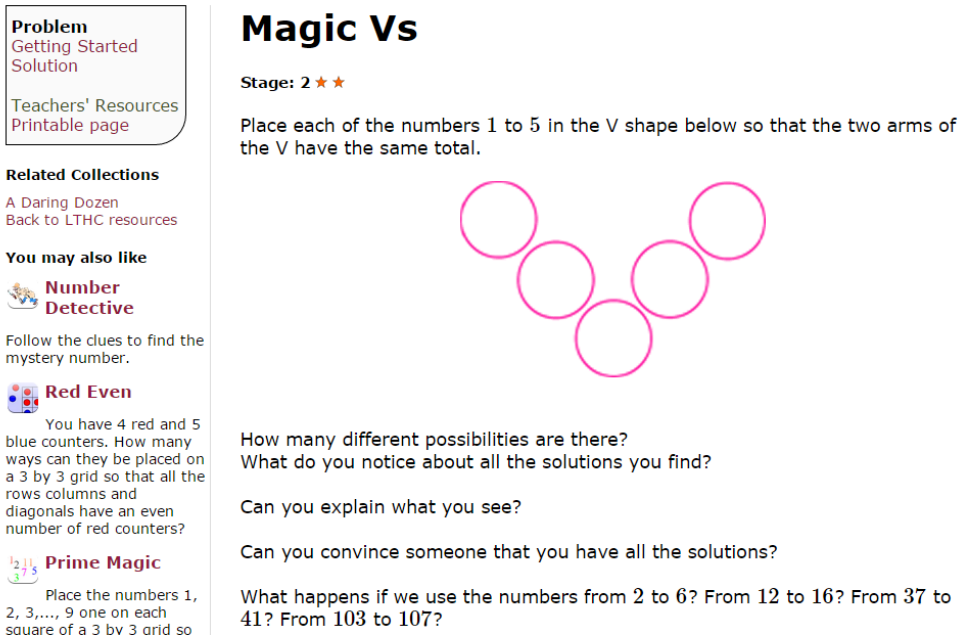
What the project involved and the impact it had on my class:

After being inspired by discussion with the strengthening links group, I decided to focus on strategies that would encourage children to take an active role in making and recognising the links in their learning. This way they would take ownership over the connections they were making and be more likely to develop a deepened understanding.

I began by creating a 'making links' display. This involved references to ongoing knowledge that they could use and apply and also a display that allowed the children to record each time they made a 'link'. Together we discussed the importance of linking together knowledge and the display board captured their interest.

Pupils were engaged by the idea of keeping a record of where they had made links. Initially, I spotted where the pupils made a link and praised them, allowing them to put a mark on the display but it wasn't long before the pupils were spotting their own and each other's links. It was only when the children began to spot their own links, that the light bulb moments really began to flow. From this we began to use the phrase 'think like a mathematician'.

An example of this was from the Nrich activity Magic Vs (http://nrich.maths.org/6274)



Problem
Getting Started
Solution

Teachers' Resources
Printable page

Related Collections

A Daring Dozen
Back to LTHC resources

You may also like

Number Detective

Follow the clues to find the mystery number.

Red Even

You have 4 red and 5 blue counters. How many ways can they be placed on a 3 by 3 grid so that all the rows columns and diagonals have an even number of red counters?

Prime Magic

Place the numbers 1, 2, 3,..., 9 one on each square of a 3 by 3 grid so

Magic Vs

Stage: 2 ★★

Place each of the numbers 1 to 5 in the V shape below so that the two arms of the V have the same total.

How many different possibilities are there?
What do you notice about all the solutions you find?

Can you explain what you see?

Can you convince someone that you have all the solutions?

What happens if we use the numbers from 2 to 6? From 12 to 16? From 37 to 41? From 103 to 107?

The pupils were starting to make links between the numbers. By sharing examples and asking what the children noticed, they spotted the relationship between odds and evens and this gave them more ownership to explore further problems and challenge themselves.

They were systematic in their thinking, moving the numbers around with thought to the relationships.

Another light bulb moment was when we were covering area and perimeter and I asked the pupils if they could find as many different rectangles as they could with an area of 24. Once we had found several, one pupil spotted that they were all factors and another quickly realised that they would be factors because they multiplied together to give the area. This then allowed them to deepen their understanding and move forward.

Post SATs, I was able to plan some lessons that involved building on prior knowledge and investigating. The pupils were encouraged to 'think like a mathematician' during this. We used the display board and the importance of making links as a way into this. From this, I noticed that the children were able to think systematically and were thinking more carefully about their problem solving in a way that they wouldn't have done previously.

The use of the display board with ongoing reference also meant that the pupils had a point of reference to act as a support.

Although the strategies seemed small, they had a huge impact on my class, particularly when building on the reasoning opportunities and open questions that were already on place. The children in my class were already used to being asked to justify their answers and explain their learning. However, by using display effectively and by encouraging children to spot their links, this became more independent and children became more engaged in thinking mathematically as they saw this as their own ideas.

Impact on the school and next steps:

As this project has focussed on the impact in my own classroom, the next steps are to use this strategy as a next step to support other teachers and improve practice further across the whole school.

In September, I will be continuing to provide INSET that embeds the changes that we have already made as a school. I will be using fluency as focus to further develop reasoning opportunities. I will implement some of the key learning that I have gained during the project such as involving staff from the outset. Staff will be more willing to take onboard changes, if they are part of the process rather than having INSET done to them and being told what to do. Therefore, I aim to share the aspects that I have tried but then allow staff to trial different approaches. We will then be able to find what works effectively, share good practice and move forward from there. By making better use of display and allowing children to do more of the work in making their own links in their learning, I hope that as a school we will continually improve the mathematics teaching, attainment and progress.

Additional Context:

When embarking on the strengthening links project, I was coming towards the end of a two year Maths Specialist Teacher (MaST) course. Part of this involved a whole school project which I was in the process of working on.

For this reason, I decided to focus on the strengthening links project with my own class. This meant that I could finish off my whole school project, whilst exploring the next steps with the pupils in my class.

The whole school project focused on teachers increasing their use of open questions and reasoning opportunities to encourage pupils to make links in their understanding. . It explored how staff were supported in improving their practice to fit with the new national curriculum (DfE, 2013) and aimed to increase the reasoning opportunities offered to pupils within mathematics lessons. By starting with some focused INSET and the chance to share and reflect on good practice, teachers were able to see the importance of reasoning for themselves and feel inspired to make this part of their weekly planning (Guskey, 2002). Through triangulation, staff questionnaires and pupil voice, I was able to analyse the impact of this project. The outcomes have been positive in relation to the frequency in which reasoning is now being encouraged by teachers in mathematics lessons and staff have been committed to embarking on a new teaching approach. Furthermore, pupils have responded enthusiastically to giving justifications and on being encouraged to think mathematically. Though this project has had positive implications within the school, it is still in its infancy. Additionally, it has taken place amongst many other significant changes in teaching such as the removal of ability sets. Furthermore, due to the changes in the mathematics national curriculum it has been difficult to analyse the impact of the project on progress. Therefore, we cannot associate any rises in attainment with

increases in reasoning opportunities alone. However, it is a project that we will continue to include in longer term school development.

As this was taking place at the start of the strengthening links project, I wanted to initially focus on my own classroom and consider the next steps. I felt that whilst I was making effective use of questioning and providing reasoning opportunities, the children could take more ownership in this. The class of children that I have taught this year have been in a low ability set during their time at school. This meant that in September they lacked confidence and showed low self-esteem. They lacked resilience and independence. The reasoning opportunities had begun to improve this as the children were beginning to make links and justify their understanding. However, I felt that there was more that could be done in encouraging the children to become actively involved in making the links they needed to consolidate their learning.

Becky Bailey